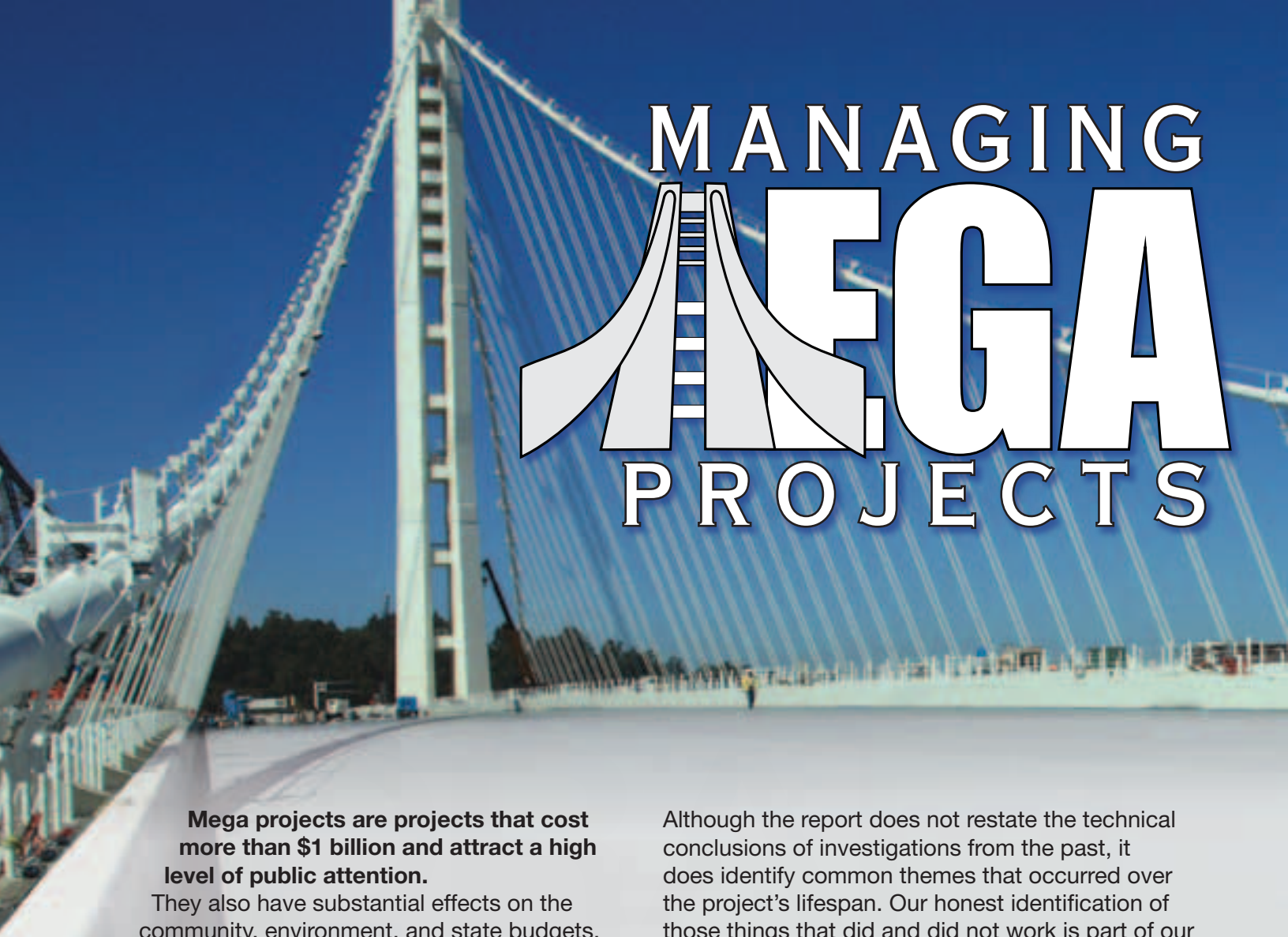

MANAGING MEGA PROJECTS

Mega projects are projects that cost more than $1 billion and attract a high level of public attention. They also have substantial effects on the community, environment, and state budgets, and they require a high skill level and attention to manage them successfully. Each mega project comes with its own challenges.

As a public agency and a good steward of California's state transportation assets, we are accountable to the public. The iconic San Francisco–Oakland Bay Bridge presented engineering, construction, management, and political challenges that had to be met and overcome. The state will face more mega projects in the future, and over the past few months, we have taken time to pause, review, and evaluate the challenges we faced with the Bay Bridge project and how they were addressed. The results of the review are contained in the *San Francisco–Oakland Bay Bridge, New East Span Project: Lessons Learned Report.* This report identifies practices that worked, practices that did not, and practices that could be improved when managing state-sponsored mega projects.

Although the report does not restate the technical conclusions of investigations from the past, it does identify common themes that occurred over the project's lifespan. Our honest identification of those things that did and did not work is part of our ongoing effort to make Caltrans and what we do more accessible and understandable to the public. One of the lessons we articulate in the report is that public access to problem-solving in action helps us explain how we work through challenges over time.

The Toll Bridge Program Oversight Committee was an effective government concept, but it should have been transparent. After the committee took oversight control in 2005, the seismic retrofit program stayed on time and within its contingency budget. This process, however, could have been more effective if these meetings were held in public. Going forward, we recommend a multiagency oversight structure, which is consistent with our ongoing effort to strengthen strategic partnerships.

A robust risk management program helped quantify the risk of potential construction scenarios and to plan accordingly, using statistical algorithms for calculating probability. The team identified overseas steel manufacturing as a critical risk and recommended robust material inspection engineers and construction management staff in China to oversee fabrication

Lessons Learned: San Francisco–Oakland Bay Bridge

quality. This risk management was useful, but the project did not get the full benefits it would have from implementing the risk management program fully from the outset rather than at the start of construction. We recommend using a risk manager for future projects.

Bringing in outside experts for technical advice was valuable for ensuring quality throughout construction. The Materials Engineering and Testing Services provided quality assurance services, the Seismic Safety Peer Review Panel—an independent body of world-renowned engineering experts—provided technical guidance, and an external Quality Assurance and Quality Control panel helped evaluate steel and overseas welding fabrication. We strongly recommend that all mega projects engage world-renowned industry experts to provide technical consultation during construction.

Mega projects produce potentially overwhelming volumes of project documentation and records that would benefit from dedicated records management, and retention personnel and tools. Developing databases to track voluminous records can be quite difficult in the midst of construction. We recommend that at the beginning of a project, Caltrans establish a formalized records management process and staff capable of managing and retaining library-style volumes of construction records throughout the project.

Consideration should be given to the contextual relationships that exist when building large infrastructure projects. California is a diverse place, and no one project is right for all communities. The state originally proposed a Spartan concrete viaduct, but that design was unacceptable to the local community, which sought a lifeline structure that related to the identity of the region it would serve. Caltrans is currently going through a period of self-analysis and is working to substantially improve our organization and our responsiveness to local community needs.

The report shows that even something that started as a challenge taught us how to better manage future mega projects, such as the planned California high-speed rail. You can read the entire report *San Francisco–Oakland Bay Bridge, New East Span Project: Lessons Learned Report* and list of recommendations [*here*].